

IN THE CLAIMS:

Please AMEND claims 1, 2, 5, 11, 13, ,15, 18, 20, 21, 24, 27, 66-73, 80, 86, 88, 91 and 92, and ADD new claims 93-95, as follows. For the Examiner's convenience, all claims currently pending in this application have been reproduced below:

1. (Currently Amended) A gas laser device, comprising:
 - a chamber for confining a laser gas therein;
 - discharging electrodes for exciting the laser gas through electrical discharging;
 - a ~~total~~ reflection mirror for ~~totally~~ reflecting laser light produced by the electrical discharging from said discharging electrode;
 - an output half-mirror for reflecting the laser light and for outputting a portion of the laser light amplified between said total reflection mirror and said output half-mirror spaced for resonant reflection of the laser light;
 - a blower rotatable in the chamber for recirculating the laser gas within said chamber through an electrical discharging region of said discharging electrodes ~~and~~; and
 - operating means including first means for operating the blower at a first rotational speed responsive to the electrical discharging of the discharge electrodes in an operational state in which the laser gas is excited by the electrical discharging from said discharge electrodes to output the laser light and second means for operating the blower at a second ~~lower speed and reduced blower load in a stand-by state~~ rotational speed lower than the first rotational speed in

which laser gas is not excited by the electrical discharging from said discharging electrodes for outputting the laser light.

2. (Currently Amended) A gas laser device according to Claim 1, wherein ~~said second means operates rotation of said blower when said gas laser device is in the stand-by state by stopping the blower~~ the second rotational speed is zero.

3. (Cancelled)

4. (Previously Presented) A gas laser device according to Claim 2, wherein said blower has a blowing blade rotatably supported within said chamber.

5. (Currently Amended) A gas laser device according to Claim 1, wherein said gas laser device comprises a noble gas halide excimer laser.

6. (Previously Presented) A gas laser device according to Claim 5, wherein said noble gas halide excimer laser comprises an XeCl excimer laser.

7. (Previously Presented) A gas laser device according to Claim 1, further comprising an exposure apparatus for exposing a substrate to the laser light supplied from said gas laser device.

8. (Previously Presented) A gas laser device according to Claim 7, wherein said second means operates rotation of said blower when said gas laser device is in the stand-by state by stopping the blower.

9. (Cancelled)

10. (Previously Presented) A gas laser device according to Claim 8, wherein said blower has a blowing blade rotatably supported within said chamber.

11. (Currently Amended) A gas laser device according to Claim 8, wherein said gas laser device comprises a noble gas halide excimer laser.

12. (Previously Presented) A gas laser device according to Claim 11, wherein said noble gas halide excimer laser comprises an XeCl excimer laser.

13. (Currently Amended) In an exposure apparatus having a main assembly for exposing a substrate to a laser light from a laser source, the laser source comprising:

(i) a chamber for confining a laser gas therein, (ii) discharging electrodes for exciting the laser gas through electrical discharging, (iii) a ~~total~~ reflection mirror for ~~totally~~ reflecting laser light produced by the electrical discharging from said discharging electrodes, (iv) an output half mirror for reflecting the laser light and for outputting a portion of the laser light

reflected between said total reflection mirror and said output half-mirror spaced for resonant reflection of the laser light, and (v) a blower rotatable in the chamber for recirculating the laser gas within said chamber through an electrical discharging region of said discharging electrodes;

operating means including first means for operating the blower at a first rotational speed responsive to the electrical discharging of the discharge electrodes in an exposure operating state in which the laser gas is excited by the electrical discharging from said discharge electrodes to output the laser light and second means for operating the blower at a second ~~lower speed and reduced blower load in a non-exposure operating state~~ rotational speed lower than the first rotational speed in which no laser gas is excited by the electrical discharging from said discharging electrodes for outputting the laser light.

14. (Previously Presented) An apparatus according to Claim 13, wherein said operating means further comprises means for increasing a rotation speed of said blower in response to a start of an exposure job in which the exposure operation is performed through said main assembly.

15. (Currently Amended) An apparatus according to Claim 14, wherein ~~said operating means stops the rotation of said blower in the absence of the start of the exposure job~~ the second rotational speed is zero.

16. (Cancelled)

17. (Previously Presented) An apparatus according to Claim 15, wherein said blower has a blowing blade rotatably supported within said chamber.

18. (Currently Amended) An apparatus according to Claim 13, wherein said laser ~~light~~ source comprises a noble gas halide excimer laser.

19. (Previously Presented) An apparatus according to Claim 18, wherein said noble gas halide excimer laser comprises an XeCl excimer laser.

20. (Currently Amended) A gas laser operating method comprising:

- confining a laser gas in a chamber;
- exciting, using discharging electrodes, the laser gas through electrical discharge;
- ~~totally~~ reflecting laser light produced by the electrical discharging from ~~said the~~ discharging electrodes by a ~~total~~ reflection mirror;
- reflecting the laser light by an output half-mirror and outputting a portion of the laser light reflected between ~~said total~~ the reflection mirror and ~~said the~~ output half-mirror spaced for resonant reflection of the laser light;
- recirculating, using a blower rotatable in the chamber, the laser gas within the chamber, through an electrical discharging region of the discharging electrodes; and
- operating the blower at a first rotational speed responsive to the electrical discharging of the discharge electrodes in an operational state in which the laser gas is excited by

the electrical discharging from ~~said~~ the discharge electrodes to output the laser light and operating the blower at a second ~~lower rotational speed and reduced blower load in a stand-by state~~ rotational speed lower than the first rotational speed in which laser gas is not excited by the electrical discharging from ~~said~~ the discharging electrodes for outputting the laser light.

21. (Currently Amended) A gas laser device according to Claim 1, wherein said gas laser device comprises an F₂ laser.

22. (Previously Presented) A gas laser device according to Claim 5, wherein said noble gas halide excimer laser comprises a KrF excimer laser.

23. (Previously Presented) A gas laser device according to Claim 5, wherein said noble gas halide excimer laser comprises an ArF excimer laser.

24. (Currently Amended) A gas laser device according to Claim 8, wherein said gas laser device comprises an F₂ laser.

25. (Previously Presented) A gas laser device according to Claim 11, wherein said noble gas halide excimer laser comprises a KrF excimer laser.

26. (Previously Presented) A gas laser device according to Claim 11, wherein said noble gas halide excimer laser comprises an ArF excimer laser.

27. (Currently Amended) An apparatus according to Claim 13, wherein said laser light source comprises an F₂ laser.

28. (Previously Presented) An apparatus according to Claim 18, wherein said noble gas halide excimer laser comprises a KrF excimer laser.

29. (Previously Presented) An apparatus according to Claim 18, wherein said noble gas halide excimer laser comprises an ArF excimer laser.

30-65. (Cancelled)

66. (Currently Amended) A gas laser device, comprising:

laser gas supplying means in a chamber for supplying a laser gas to an exciting region in the chamber;

exciting means for exciting the laser gas supplied to the exciting region; and

~~control means for controlling said laser gas supplying means on the basis of whether the laser gas is to be excited by said exciting means or not;~~

wherein said ~~supplying means operates to supply the laser gas at a first circulating rate in response to the laser gas being excited by the exciting means and operates to supply the laser gas at a second lower circulating rate and reduced load in response to the laser gas not being excited by the exciting means~~ gas laser device controls said laser gas supplying means so that, when the laser gas is excited by said exciting means, the laser gas is circulated at a first circulating rate and so that, when the laser gas is not excited by said exciting means, the laser gas is circulated at a second circulating rate lower than the first circulating rate.

67. (Currently Amended) A ~~laser gas~~ laser device according to Claim 66, wherein said laser gas supplying means includes a blower.

68. (Currently Amended) A ~~laser gas~~ laser device according to Claim 67, wherein said ~~control means~~ gas laser device controls a number of revolutions of said blower.

69. (Currently Amended) A ~~laser gas~~ laser device according to Claim 66, wherein said exciting means includes two discharging electrodes disposed to sandwich said exciting region therebetween.

70. (Currently Amended) A ~~laser gas~~ laser device according to Claim 69, wherein said exciting means further includes a resonator.

71. (Currently Amended) A ~~laser~~ gas laser device according to Claim 70, wherein said resonator comprises a pair of mirrors.

72. (Currently Amended) A ~~laser~~ gas laser device according to Claim 71, wherein said pair of mirrors includes a total reflection mirror.

73. (Currently Amended) In an exposure apparatus having a main assembly for exposing a substrate to a laser light from a laser light source, the laser light source comprising:

a gas laser device including (i) laser gas supplying means in a chamber for supplying a laser gas to an exciting region in the chamber, and (ii) exciting means in the exciting region for exciting the laser gas supplied to the exciting region; and

~~control means for controlling said laser gas supplying means on the basis of whether the laser gas is to be excited by said exciting means or not.~~

wherein said ~~supplying means operates to supply the laser gas at a first circulating rate in response to the laser gas being excited by the exciting means and operates to supply the laser gas at a second lower circulating rate and reduced load in response to the laser gas not being excited by the exciting means~~ gas laser device controls said laser gas supplying means so that, when the laser gas is excited by said exciting means, the laser gas is circulated at a first circulating rate and so that, when the laser gas is not excited by said exciting means, the laser gas is circulated at a second circulating rate lower than the first circulating rate.

74. (Previously Presented) An apparatus according to Claim 73, wherein said laser gas supplying means includes a blower.

75. (Previously Presented) An apparatus according to Claim 74, wherein said control means controls a number of revolutions of said blower.

76. (Previously Presented) An apparatus according to Claim 73, wherein said exciting means includes two discharging electrodes disposed to sandwich said exciting region therebetween.

77. (Previously Presented) An apparatus according to Claim 76, wherein said exciting means further includes a resonator.

78. (Previously Presented) An apparatus according to Claim 77, wherein said resonator comprises a pair of mirrors.

79. (Previously Presented) An apparatus according to Claim 78, wherein said pair of mirrors includes a total reflection mirror.

80. (Currently Amended) A gas laser device comprising:

a chamber for confining a laser gas therein;

discharging electrodes for exciting the laser gas through electrical discharge;
a ~~total~~ reflection mirror for amplifying laser light produced by the electrical discharging from said discharging electrodes;
an output half-mirror for amplifying the laser light and for outputting a portion of the laser light amplified between said ~~total~~ reflection mirror and said output half-mirror spaced for resonant reflection of the laser light;
recirculating means rotatable in the chamber for recirculating the laser gas within said chamber, through an electrical discharging region of said discharging electrodes; and
control means for controlling said recirculating means in an in-operation state responsive to electrical discharging of the discharging electrodes to provide a first gas circulation rate in which the laser gas is excited by the electrical discharging from said discharging electrodes to output the laser light and controlling said recirculating means in a stand-by state to provide a second ~~lower gas circulation rate at a reduced load~~ gas recirculating rate lower than the first gas recirculating rate in which no laser gas is excited by the electrical discharging from said discharging electrodes for outputting laser light.

81. (Previously Presented) A gas laser device according to Claim 80, wherein said control means is operable to cause gas circulation by said means to stop in the stand-by state.

82. (Previously Presented) A gas laser device according to Claim 80, wherein said recirculation means includes a blower provided within said chamber.

83. (Previously Presented) A gas laser device according to Claim 82, wherein said blower has a blower blade rotatably supported within said chamber.

84. (Previously Presented) A gas laser device according to Claim 80, wherein said gas laser device comprises one of a noble gas halide excimer laser and an F₂ laser.

85. (Previously Presented) A gas laser device according to Claim 84, wherein said noble gas halide excimer laser comprises one of an XeCl excimer laser, a KrF excimer laser, and an ArF excimer laser.

86. (Currently Amended) In an exposure apparatus having a main assembly for exposing a substrate to [[a]] laser light from a laser light source, the laser light source comprising:

(i) a chamber for confining a laser gas ~~therein~~, therein;

(ii) discharging electrodes for exciting the laser gas through electrical ~~discharge~~, discharge;

(iii) a ~~total~~ reflection mirror for amplifying laser light produced by the electrical discharging from said discharging ~~electrodes~~, electrodes;

(iv) an output half-mirror for amplifying the laser light and for outputting a portion of the laser light amplified between said ~~total~~ reflection mirror and said output half-mirror spaced for resonant reflection of the laser ~~light~~, light; and

(v) recirculation means rotatable in the chamber for recirculating the laser gas within said chamber, through an electrical discharging region of said discharging electrodes; and

(vi) control means for controlling said recirculating means in an exposure state responsive to electrical discharging of the discharging electrodes to provide a first gas circulation rate in which the laser gas is excited by the electrical discharging from said discharging electrodes to output the laser light and controlling said recirculating means in a non-exposure state to provide a second ~~lower gas circulation rate at a reduced load~~ gas recirculating rate lower than the first gas recirculating rate in which no laser gas is excited by the electrical discharging from said discharging electrodes for outputting laser light.

87. (Previously Presented) An apparatus according to Claim 86, wherein said control means is operable to increase the gas circulation rate of said recirculation means in response to a start of an exposure job in which the exposure operation is performed by the exposure apparatus.

88. (Currently Amended) An apparatus according to Claim 87, wherein said control means is operable to stop said recirculation means in the absence of a start of the exposure job.

89. (Previously Presented) An apparatus according to Claim 88, wherein said recirculation means includes a blower provided within said chamber.

90. (Previously Presented) An apparatus according to Claim 89, wherein said blower has a blower blade rotatably supported within said chamber.

91. (Currently Amended) A semiconductor device manufacturing method comprising the steps of:

transferring a predefined pattern onto a substrate by use of an exposure apparatus;

and

manufacturing a semiconductor device from the patterned substrate,

wherein said exposure apparatus includes (I) a laser light source that includes (i) a chamber for confining a laser gas therein, (ii) discharging electrodes for exciting the laser gas through electrical discharge, (iii) a ~~total~~ reflection mirror for amplifying laser light produced by the electrical discharging from said discharging electrodes, (iv) an output half-mirror for amplifying the laser light and for outputting a portion of the laser light amplified between said ~~total~~ reflection mirror and said output half-mirror spaced for resonant reflection of the laser light, and (v) recirculation means rotatable in the chamber for recirculating the laser gas within said chamber, through an electrical discharging region of said discharging electrodes; (II) a main assembly for exposing the substrate to the laser light from said laser light source; and (III) control means for controlling said recirculating means in an exposure state responsive to electrical discharging of the discharging electrodes to provide a first gas circulation rate in which the laser gas is excited by the electrical discharging from said discharging electrodes to output the laser light and controlling said recirculating means in a non-exposure operating state to provide a

second ~~lower gas circulation rate at a reduced load~~ gas recirculating rate lower than the first gas recirculating rate in which no laser gas is excited by the electrical discharging from said discharging electrodes for outputting laser light.

92. (Currently Amended) A semiconductor manufacturing method, comprising the steps of:

transferring a predefined pattern onto a substrate by use of an exposure apparatus;

and

manufacturing a semiconductor device from the patterned substrate,

wherein the exposure apparatus includes (I) a gas laser device having (i) laser gas supplying means in a chamber for supplying a laser gas to an exciting region in the chamber, and (ii) exciting means for exciting the laser gas supplied to the exciting region; a main assembly for exposing the substrate to the laser light from said laser light source; and (II) control means for controlling said laser gas supplying means on the basis of whether the laser gas is to be excited by said exciting means or not and wherein said supplying means operates to supply the laser gas at a first circulating rate in response to the laser gas being excited by the exciting means and operates to supply the laser gas at a second ~~lower circulating rate and reduced load~~ gas circulating rate lower than the first gas circulating rate in response to the laser gas not being excited by the exciting means.

93. (New) An exposure apparatus having an exposure job to be executed for exposure of a plurality of substrate, said apparatus comprising:

a laser light source including (i) a chamber for confining a laser gas therein, (ii) a discharging electrode for exciting the laser gas through electrical discharge so that laser light is outputted from said chamber, and (iii) circulating means for circulating the laser gas inside said chamber so that the laser gas passed through an electrical discharging region of said discharging electrode is circulated within said chamber and returns back to the electrical discharging region of said discharging electrode;

an exposure apparatus major assembly arranged to perform exposure by use of laser light from said laser light source; and

control means for controlling said circulating means,

wherein said exposure apparatus operates, after said laser light source is put into a warming-up state, into a sequence of a start of an exposure job, finish of the exposure job and a start of a subsequent exposure job, and

wherein said control means is arranged to cause said circulating means to continue the laser gas circulating operating from start to finish of the exposure job and to stop said circulating means from a finish of an exposure job to a start of a subsequent exposure job.

94. (New) An apparatus according to Claim 93, further comprising a blower, and detecting means for detecting the number of rotations of said blower, wherein the exposure job is interrupted when the number of blower rotations involves a disorder.

95. (New) A semiconductor manufacturing method, comprising:
a process of producing a semiconductor device upon a substrate by use of an
exposure apparatus as recited in Claim 93.